M800: Rugged-by-Design™ Neutron Detectors
Highly sensitive SiPM-based neutron detectors

He-3-free, highly sensitive and scalable neutron detectors. For seamless integration into detection systems such as radiation portal monitors, mobile detection systems or measurement networks. The M800 is powered via PoE* and accessible by its IP address, making integration and maintenance straightforward. The M800 allows operation in magnetic fields and does not require high voltage.

Key features
- Modular, scalable, straightforward integration
- Rugged SiPM**-based design (no PMT)
- He-3 free, not dependent on scarce or expensive materials
- No high voltage required
- IP addressable
- Not susceptible to magnetic fields
- No toxic materials
- Based on LiF converter foils and noble gas scintillation
- Ingress-proof environmental package on request

* PoE = Power over Ethernet  ** SiPM = Silicon Photomultiplier
M800: Rugged-by-Design™
Neutron Detectors
Highly sensitive SiPM-based neutron detectors

Case Studies: M800 Integration
- Integration in RPMs as technology upgrade
- Integration into tactical vehicles (pursuers, patrols etc.)
- Coastal guard speed boats integration

Technology Description
Helium-4 is used as a scintillation medium. Helium-4 (natural helium) has proven to be an excellent choice for a neutron detection medium as it is transparent to its own light and has low electron density, making it insensitive to gamma radiation. A proprietary, large area LiF-based coating inside the detector tube captures neutrons, emitting highly energetic charged particles in the process. The energy of the charged particles is converted into light and detected by SiPM light sensors. On board electronics perform digital pulse shape discrimination to reject gamma-induced events and provide a pulse for every detected neutron. Robustness is achieved by eliminating fragile components such as crystals, photomultiplier tubes and sensitive anode wires.

Detector Specifications

<table>
<thead>
<tr>
<th>Package</th>
<th>M800</th>
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</thead>
<tbody>
<tr>
<td>Detector with integrated signal processing. User configurable data broadcasted on TCP/IP.</td>
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<table>
<thead>
<tr>
<th>Physical Specifications</th>
<th>M800</th>
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<tbody>
<tr>
<td>Size: 916.2 mm x 144 mm x 144 mm, weight: 8.6 kg (without HDPE moderator)</td>
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<thead>
<tr>
<th>Neutron Sensitivity</th>
<th>M800</th>
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<tbody>
<tr>
<td>0.5 - 1.05 cps/ng Cf-252 at 2 m (1 ng Cf-252 emits ~2300 n/s), depending on HDPE moderator</td>
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<thead>
<tr>
<th>Gamma Rejection</th>
<th>M800</th>
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<tbody>
<tr>
<td>Gamma rejection: &lt;10^-6</td>
<td></td>
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<tr>
<td>Gamma immunity up to 100 μSv/hr with 0.9 &lt; GARRn* &lt;1.1</td>
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<thead>
<tr>
<th>Signal Output</th>
<th>M800</th>
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<tbody>
<tr>
<td>A single Ethernet cable serves as the control and signal output interface</td>
<td></td>
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<tr>
<td>TTL output optional. TTL pulse width: standard 80 ns, can be programmed from 10-2560 ns.</td>
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<table>
<thead>
<tr>
<th>Control Cable Connection</th>
<th>M800</th>
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<tbody>
<tr>
<td>RJ45 (Cat6)</td>
<td></td>
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<thead>
<tr>
<th>Power Supply</th>
<th>M800</th>
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<tbody>
<tr>
<td>IEEE 802.af Type 1 Class II; Typical consumption: 4W No high voltage required</td>
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<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>M800</th>
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<tr>
<td>-30°C to 55°C</td>
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<table>
<thead>
<tr>
<th>Storage Conditions</th>
<th>M800</th>
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<tr>
<td>-30 °C to 65 °C</td>
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<table>
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<tr>
<th>Case</th>
<th>M800</th>
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<tr>
<td>IP65 rated Aluminum Casing</td>
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<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th>M800</th>
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</thead>
<tbody>
<tr>
<td>up to 93% at 40 °C</td>
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<table>
<thead>
<tr>
<th>Salt Water Spray</th>
<th>M800</th>
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<tbody>
<tr>
<td>up to 5% NaCl at 35 °C</td>
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<tr>
<th>Ingress Protection Degree</th>
<th>M800</th>
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<tbody>
<tr>
<td>IP62</td>
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<tr>
<th>Standards</th>
<th>M800</th>
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<tr>
<td>CE; 2014/68/EU</td>
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<tr>
<th>Certifications</th>
<th>M800</th>
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For additional information contact:
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